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22. THE FISH FAUNA OF BHARATHAPUZHA RIVER, KERALA

In Kerala, 44 rivers and an elaborate network of their tributaries harbour a rich and diverse fish fauna. Ichthyofaunal investigations in Kerala, which began with the outstanding works of Jerdon (1849) and Day (1865, 1878), were followed by several other researchers (Pillay 1929, Mukerji 1931, Hora and Law 1941, Hora and Nair 1941, Hora 1942, Silas 1950, 1951, 1952, Rajan 1955, Rema Devi and Indra 1986, Shaji and Easa 1995, Shaji *et al.* 1995, Easa and Shaji 1996, 1997, Biju *et al.* 1999a, b). Yet, the fish diversity in the larger rivers of Kerala remains to be investigated in detail.

Bharathapuzha (Nila) is the longest river in Kerala and the second largest on the southwest coast of India. There are no records of the fish diversity of this river, which is currently under severe ecological degradation due to human impacts. This paper documents the diversity and status of fish fauna of this river system.

The Bharathapuzha river originates from the Anamalai Hills in the Western Ghats at 1,964 m above msl, and flows through Coimbatore district, Tamil Nadu, and Palakkad, Malappuram and Thrissur districts, Kerala and finally meets the Arabian Sea at Ponnani. In Kerala, it has a total length of 209 km and a basin area of 4,400 sq. km (CWRDM 1991). Its main tributaries are the Gayatripuzha, Chitturpuzha (Kannadipuzha or Amaravathipuzha), Kalpathipuzha and Thuthapuzha. From the confluence of Kalpathipuzha and Chitturpuzha at Parali, the river is named Bharathapuzha.

The river basin can be divided into three physiographic zones: the coastal belt, the midland and the highland. The fish survey was conducted in the midland zone. The undulating midland with laterite formation is characterised by a number of *elas* or small, cultivated watershed areas. A number of low laterite hills in this region are interspersed with paddy fields, coconut and areca nut groves and of late, with plantations of cash crops (CWRDM 1991).

Fish samples were collected from March 1997 to March 1999, from different locations in the midland region of the river from Parali to Thirunavaya using cast nets, scoop nets and gill nets of varying mesh size. Conventional methods such as sieving through cloth were also used. Uniform fishing efforts were maintained at all the stations and similar types of nets were employed. The pigmentation was recorded in fresh fishes, which were then fixed in 5% formalin. The works of Day (1865, 1878), Jayaram (1981), Fischer and Bianchi (1984) and Talwar and Jhingran (1991) were referred for identification. The species were categorised into rare, very rare and abundant, based on the catch data.

Sixty-one species of fishes, belonging to 11 orders, 30 families and 50 genera were recorded for the first time from the Bharathapuzha river (Table 1). The results show that despite extensive environmental degradation such as sand mining, rock blasting, pollution and siltation, the river has rich and diverse fish resources.

Of the 61 fish species recorded, *Batasio travancoria* and *Tetraodon travancoricus* are endemic to Kerala, while *Corica soborna*, *Chela dadyburjori* and *Lepidocephalus guntea* are new records. *Barilius bendelisis* was reported to occur widely except in Kerala (Talwar and Jhingran 1991). This study confirms its presence in the State. Among the 61 species of fish collected, 24.59% are very rare while 31.15 % are rare.

Anguilla bengalensis bengalensis, *Batasio travancoria*, *Hypselobarbus curmuca*, *Mystus malabaricus* and *Tetraodon travancoricus* are endangered, and *Puntius sarana subnasutus*, *Tor khudree*, *Heteropneustes fossilis*, *Mystus montanus*, *Anabas testudineus*, *Parambassis thomassi* and *Macrognathus guentheri* are vulnerable, according to IUCN criteria (Molur and Walker 1998).

The major Indian carps *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala*, and *Labeo fimbriatus* cultivated in the Malampuzha dam located in the upper reaches of the river, escaped to the lower reaches, have established good populations there. Similarly, the presence of a larger number of exotic fish such as *Oreochromis mossambica* in the river is a matter of concern to the native fish stock.

Species such as *Megalops cyprinoides*, *Chanos chanos*, *Microphis cuncalus*, *Ambassis commersoni*, *Terapon jarbua*, *Megalopsis cordyla*, *Leiognathus guentheri*, *Lutjanus argentimaculatus*, *Gerres filamentosus*, *Scatophagus argus*, *Liza tade*, *Glossogobius giuris*, *Cynoglossus macrostomus* and *Euryglossa orientalis* are primarily estuarine fishes collected from the freshwater regions of the river. Of these, *Gerres filamentosus*, *Glossogobius giuris*, *Lutjanus argentimaculatus* and *Megalopsis cordyla* migrate from the saline waters to about 85 km upstream and were collected from Lakkidi region.

Studies are warranted to realise the impact of check-dams on the migration of fishes, as more check-dams are coming up in the river. Both *Anguilla bengalensis bengalensis* and *A. bicolor bicolor* are catadromous and the adult eels probably migrate to the deep ocean for spawning; the returning glass eels (larvae) and elvers (young ones) try to migrate far upstream where they grow for many years (Wickstrom *pers. comm.*). Considerable reduction in the population of eels indicates the need to study the impact of check-dams. Further, installing a suitable kind of eel ladder at every dam in the river is also indicated.

Flow regulation by means of check-dams, pollution (mainly agricultural and sewage), sand and clay mining, destruction of natural pools and unscientific fishing methods are the major threats to fish fauna in the river. Some conservation measures are suggested to preserve the ichthyofauna.

1. Fishing by poisoning and dynamiting should be banned.

2. The existing natural pools, which are the breeding centres of the fishes should be protected from fishing. Fish sanctuaries or aquatic biodiversity management zones could be set up.

3. There should be measures to control the pollution of the river, especially from agricultural sources.

4. Regulation of mesh size of nets to prevent large-scale death of juvenile fish in the nets.

5. Assessment of the population density and habitat requirements of fishes in the river.

6. Detailed investigations on the impact of check-dams on the natural migration of the fishes.

7. Assessment of extent of damage done by the increasing population of exotic species to the indigenous stock of the river.

TABLE 1

LIST OF FISHES COLLECTED FROM BHARATHAPUZHA RIVER, KERALA

	Species	Status
	Order: ELOPIFORMES	
	Family: MEGALOPIDAE	
1.	*Megalops cyprinoides* (Broussonet)	VR
	Order: ANGUILLIFORMES	
	Family: ANGUILLIDAE	
2.	*Anguilla bengalensis bengalensis* (Gray)	VR
3.	*A. bicolor bicolor* McClelland	R
	Order: CLUPEIFORMES	
	Family: CLUPEIDAE	
4.	*Corica soborna* (Hamilton-Buchanan)	R
	Order: GONORHYNCHIFORMES	
	Family: CHANIDAE	
5.	*Chanos chanos* (Forsskal)	VR
	Order: CYPRINIFORMES	
	Family: CYPRINIDAE	
	Subfamily: Cyprininae	
6.	*Catla catla* (Hamilton-Buchanan)	A
7.	*Cirrhinus mrigala mrigala* (Hamilton-Buchanan)	R
8.	*Hypselobarbus curmuca* (Day)	VR
9.	*Labeo fimbriatus* (Bloch)	R
10.	*L. rohita* (Hamilton-Buchanan)	R
11.	*Puntius amphibius* (Valenciennes)	A
12.	*P. filamentosus* (Valenciennes)	A
13.	*P. parrah* (Day)	A
14.	*P. sarana subnasutus* (Valenciennes)	A
15.	*P. ticto* (Hamilton-Buchanan)	R
16.	*P. vittatus* (Day)	A
17.	*Tor khudree* (Sykes)	VR
	Subfamily: Cultrinae	
18.	*Chela dadyburjori* Menon	R
19.	*Salmostoma boopis* (Day)	R
	Subfamily: Rasborinae	
20.	*Amblypharyngodon microlepis* (Bleeker)	A
21.	*Barilius bendelisis* (Hamilton-Buchanan)	A
22.	*Danio malabaricus* (Jerdon)	A
23.	*Esomus danricus* (Hamilton-Buchanan)	A
24.	*Parluciosoma daniconius* (Hamilton-Buchanan)	A
	Subfamily: Garrinae	
25.	*Garra mullya* (Sykes)	A
	Family: COBITIDAE	
26.	*Lepidocephalus guntea* (Hamilton-Buchanan)	A

LIST OF FISHES COLLECTED FROM BHARATHAPUZHA RIVER, KERALA

	Species	Status
	Order: SILURIFORMES	
	Family: BAGRIDAE	
27.	*Batasio travancoria* Hora & Law	VR
28.	*Mystus cavasius* (Hamilton-Buchanan)	A
29.	*M. malabaricus* (Jerdon)	R
30.	*M. montanus* (Jerdon)	A
31.	*M. oculatus* (Valenciennes)	A
	Family: SILURIDAE	
32.	*Ompok bimaculatus* (Bloch)	R
33.	*Wallago attu* (Schneider)	A
	Family: HETEROPNEUSTIDAE	
34.	*Heteropneustes fossilis* (Bloch)	R
	Order: CYPRINODONTIFORMES	
	Family: HEMIRAMPHIDAE	
35.	*Hyporhampus limbatus* (Valenciennes)	A
	Family: BELONIDAE	
36.	*Xenentodon cancila* (Hamilton-Buchanan)	A
	Family: APLOCHEILIDAE	
37.	*Aplocheilus lineatus* (Arnold)	A
	Order: SYNGNATHIFORMES	
	Family: SYNGNATHIDAE	
38.	*Microphis cuncalus* (Hamilton-Buchanan)	VR
	Order: PERCIFORMES	
	Family: AMBASSIDAE	
39.	*Ambassis commersoni* Cuvier	VR
40.	*Parambassis thomassi* (Day)	A
	Family: TERAPONIDAE	
41.	*Terapon jarbua* (Forsskal)	VR
	Family: CARANGIDAE	
42.	*Megalopsis cordyla* (Linnaeus)	R
	Family: LEIOGNATHIDAE	
43.	*Leiognathus blochii* (Valenciennes)	VR
	Family: LUTJANIDAE	
44.	*Lutjanus argentimaculatus* (Forsskal)	R
	Family: GERREIDAE	
45.	*Gerres filamentosus* (Cuvier)	R
	Family: SCATOPHAGIDAE	
46.	*Scatophagus argus* (Linnaeus)	VR

TABLE 1 (CONTD.)

LIST OF FISHES COLLECTED FROM BHARATHAPUZHA RIVER, KERALA

	Species	Status
	Family: CICHLIDAE	
47.	*Etroplus maculatus* (Bloch)	A
48.	*E. suratensis* (Bloch)	A
49.	*Oreochromis mossambica* (Peters)	A
	Family: MUGILIDAE	
50.	*Liza tade* (Forsskal)	VR
	Family: GOBIIDAE	
51.	*Awaous gutum* (Hamilton-Buchanan)	A
52.	*Glossogobius giuris* (Hamilton-Buchanan)	R
53.	*Sicyopterus griseus* (Day)	VR
	Family: ELEOTRIDIDAE	
54.	*Eleotris* sp.	VR
	Family: ANABANTIDAE	
55.	*Anabas testudineus* (Bloch)	R
	Family: CHANNIDAE	
56.	*Channa marulius* (Hamilton-Buchanan)	R
	Family: MASTACEMBELIDAE	
57.	*Macrognathus guentheri* (Day)	A
58.	*Mastacembeles armatus* (Lacepede)	A
	Order: PLEURONECTIFORMES	
	Family: CYNOGLOSSIDAE	
59.	*Cynoglossus macrostomus* Norman	VR
	Family: SOLEIDAE	
60.	*Euryglossa orientalis* (Bloch & Schneider)	R
	Order: TETRAODONTIFORMES	
	Family: TETRAODONTIDAE	
61.	*Tetraodon travancoricus* Hora & Nair	R

A = abundant; VR = very rare; R = rare

8. Fishing at the onset of monsoon, the breeding season, should be controlled.

9. Biodiversity monitoring and awareness programmes highlighting the need to protect the river and its biodiversity for the inhabitants of over 140 villages in the river basin.

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23. OCCURRENCE OF CHILLI GALL MIDGE, *ASPHONDYLIA CAPSICI* BARNES (CECIDOMYIIDAE: DIPTERA) IN SOUTH ANDAMANS, ANDAMAN ISLANDS

The chilli gall midge, *Asphondylia capsici* Barnes is a serious pest of chillies and bell pepper, with the potential to reduce the yield by infesting fruiting parts. Ayyanna and Raghavaiah (1990) reported the occurrence of this pest on chillies at Bapatla, Andhra Pradesh, leading to deformation of the flower buds and bud-drop to the extent of 6.5%.

During 1998 and 1999, from September-January, we noticed the pest on the bell pepper grown in our experimental plots. Damage of up to 28 % was recorded. The attacked flowers malformed into galls, dried up and dropped to the ground. The infected flowers when dissected showed pale orange maggots 3 mm long. The malformed buds were incubated in plastic containers over sand to facilitate pupation and emergence of adult *A. capsici*. The adult midge was dark, reddish-brown, mosquito-like, measuring 3 mm in length. During the course of rearing, two unidentified hymenopterous parasitoids were also obtained, which had parasitized the larvae and pupae. Tomar *et. al.*, (1997) reported *Eurytoma* sp., *Dinarmus* sp. and *Bracon* sp. parasitizing *A. capsici* larvae and pupae.

This is the first report of the pest from Andaman Islands.

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